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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/917,911	07/31/2001	Akihiro Muroguchi	WATK:214	1155

EXAMINER
OLSEN, KAJ K

ART UNIT	PAPER NUMBER
1753	

7590 06/23/2004

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DATE MAILED: 06/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/917,911	MUROGUCHI ET AL.	
	Examiner	Art Unit	
	Kaj K Olsen	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-9 and 14-20 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11 and 13 is/are allowed.
- 6) ☒ Claim(s) 10 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Election/Restriction

1. Applicant's election of group II in the reply filed on 4-13-2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Claims 1-9 and 14-20 are withdrawn from further consideration.

Claim Rejections - 35 USC § 112

2. The previous 112 rejections have been withdrawn in view of the amendment to the claims.

Claim Objections

3. Amended claim 12 has a misspelling of --sensor-- as "ssnsor".

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

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evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Usami et al (USP 4,902,400) in view of Logothetis et al (High-Temperature Oxygen Sensors Based on Electrochemical Oxygen Pumping, pp. 136-154).

7. Usami discloses a method of measuring the oxygen concentration of a measurement gas using an oxygen sensor comprising a first air duct 56, a second air duct 20, and a measurement duct 16 defined by a plurality of solid electrolyte layers (fig. 3). The measurement duct of Usami contains an oxygen discharge electrode 6 (i.e. an inner pumping electrode) and a concentration detecting electrode 12 (col. 6, lines 24-37). Usami further discloses an oxygen pump cell formed of an oxygen feed electrode 8 in the first reference duct 56 and the oxygen discharge electrodes (col. 7, lines 41-50), and a concentration detecting cell having an air reference electrode 14 formed in the second air duct and the concentration detecting electrode 12 (col. 7, lines 50-62).

8. Although Usami does not clearly lay out how this combination of concentration detection cell and pump cell operate (with particular attention to the use of the feedback control between the concentration detection cell and the pump cell and the use of the current from the pump cell as a measure of the oxygen concentration), Logothetis teaches that this is the conventional manner in which these electrochemical cells (known in the art as "double-cells") are operated. In particular, Logothetis teaches that the pump current is applied in such a manner that the

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electromotive force as measured by the concentration detection cell is maintained as a particular prescribed voltage and the resulting pump current becomes the measure of the oxygen concentration. See pp. 145 through 148 and fig. 7. Operating the sensor in this manner would result in a sensor less susceptible to sensor polarization and degradation (p. 145, third paragraph). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Logothetis for the method of Usami in order to operate the sensor in a manner less susceptible to polarization and degradation.

9. With respect to “feeding” the oxygen necessary for the sensor, see Usami, col. 3, lines 28-35.

10. With respect to the level of oxygen in the measuring gas being a “trace” amount, the levels of oxygen in the exhaust gas of Usami (especially in rich exhaust gas (col. 3, lines 28-35)) would read on the term “trace” giving the claim language its broadest reasonable interpretation.

11. With respect to the use of less than 240 mV, it would appear that Logothetis already suggests doing so because Logothetis teaches utilizing sensor voltages of 15-50 and greater than 100 mV (see final paragraph of p. 145 through 147). That would appear to inherently provide in the concentration detecting cell a oxygen concentration of at least 2 ppm. This is evidenced by Kato which teaches that the choice of voltage for the concentration detecting cell governs what the concentration of oxygen would be in the concentration detecting cell (fig. 6 and 8 and col. 13, lines 24-45)

Allowable Subject Matter

12. Claims 11 and 13 are allowed.

13. Claim 12 would be allowed pending the spelling correction described above.

Response to Arguments

14. Applicant's arguments filed on 4-13-2004 have been fully considered but they are not persuasive. Applicant urges that Logothetis teaches in fig. 7 that the lower part of the measured oxygen concentration is 0.5% and that this would not teach one how to make a trace oxygen sensor. This is unpersuasive for a number of reasons. First, applicant never defines in the claims or the specification what a "trace amount" of oxygen would be. The reference to 2 ppm in claim 10 has been interpreted as what the oxygen concentration range would be at that prescribed voltage range. Moreover, it would appear that the 2 ppm of the claim is the localized oxygen concentration in the concentration detecting cell (as a result of the pumping action) and isn't necessarily the oxygen concentration outside of the gas sensor. The examiner demonstrates this with new reference Kato et al (USP 5,866,799), which describes how the oxygen concentration of the first internal space is maintained at a low oxygen concentration (i.e. 1 ppm) irrespective of the oxygen concentration outside of the sensor. See fig. 6 and 8 and col. 13, lines 24-45. Second, even if 2 ppm were part of the claimed method, the claim states "at least 2 ppm" meaning that anything above 2 ppm is part of the claimed invention. Both Usami and Logothetis clearly teach greater than 2 ppm of concentration. Third, the rejection was not based on the sensor of Logothetis, but rather the sensor of Usami. Logothetis was utilized for its teaching of how to operate a "double pump" sensor. It is unclear how any limitations of the actual sensor of Logothetis necessarily transfer to the sensor of Usami, which was constructed in a different manner. In fact, Usami appears to indicate that ppm levels of detection are accessible because it

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knows how much current is produced per ppm of gas (col. 11, lines 18-25). Parts-per-million levels of detection would clearly qualify as trace concentrations and Usami is inherently capable of monitoring trace levels of oxygen.

15. Applicant further urges that there is no suggestion of these teachings of the characteristic effect that a high output linearity can be attained by limiting the feedback control to an electromotive force that follows the Nernst formula. First, it doesn't appear applicant is claiming anything about a high output linearity. Second, when does a concentration detecting cell ever not follow the Nernst formula? The Nernst formula governs what electromotive force is induced across the concentration detecting electrode would be (see p. 136 and the first paragraph of p. 145 of Logothetis). The examiner does not see how the claimed prescribed voltage reads free of standard double pump cell operations. The examiner concedes that there may be novelty in how applicant is operating its oxygen concentration measurement, but the manner that the applicant has claimed that feature does not read free of the prior art double pump cell operation.

Conclusion

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (571) 272-1344. The examiner can normally be reached on Monday through Thursday from 6:30 A.M. to 4:00 P.M. and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kaj Olsen Ph.D.
Primary Examiner
AU 1753
June 17, 2004